

*Picture Supplement on
The Royal Visit*

British

Affairs

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Britain's Economic Position

Nuclear Power Progress

Conservation and Planning

Britain's Fishing Industry

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Britain has two economic problems — the internal one of inflation and the external one of foreign exchange.

Britain's Two Economic Problems

The fundamental truth about sterling, said the Chancellor of the Exchequer, Mr. Peter Thorneycroft, in a debate in the House of Commons on October 29, is that the value of the £ at home and the value of the £ abroad are, in the last resort, the same thing, and one cannot tamper with the one without affecting the other.

"If we let the process of decline go far enough, we precipitate, of course, a devaluation. It has happened that way before, and unless we support measures to stop it it could happen again. And if it did, everybody's standard of life would go down. Food would cost more, raw material imports would cost more. One cannot contract out of a situation of that kind, even by pressing for higher wage claims, except at the cost of precipitating devaluation to an even lower level yet."

A STRONG £ ESSENTIAL

Mr. Thorneycroft said that inflation had to be beaten even if other ends of policy had to be sacrificed to serve that aim. Talk of inflation was not out of date merely because some people are saying there will be a slump.

"I would say just this about a slump. There may be some levelling off of activity in the world outside. Commodity prices have, in fact, been falling and a great deal turns upon the policy which is pursued by the United States and other creditor Governments. But even supposing that there was a falling off of demand abroad, that would not be an excuse for an inflation here in the United Kingdom — indeed, rather the reverse. A strong £ and the absence of inflation here is a prerequisite to riding the rise and fall of demand in the world outside."

FOREIGN EXCHANGE AND INFLATION

The Chancellor said that Britain had two economic problems:

I. *Foreign Exchange Crisis*: "If the root of our problems lies here at home, it was the crisis abroad which high-lighted our situation. For the last eight years we have maintained the parity of the £ at 2 dollars

BRITAIN ACTS TO MAKE STERLING STRONG

The Chancellor of the Exchequer, Mr. Peter Thorneycroft, announced on September 19 new measures to strengthen the £ sterling. They were:

1. an immediate increase of two per cent in the Bank Rate (equivalent to the Federal Reserve Discount Rates in the U.S.) from 5% to 7%.
2. a decision to hold down investment by Government Departments, Municipal Authorities, and the nationalized industries (coal, gas and electricity, transport, and civil aviation).
3. all necessary measures to hold the average level of Bank Advances to private borrowers during the next 12 months to the same average level as in the last 12 months.

80 cents in very disturbed conditions. There is much to be proud of in that period. Trade has steadily expanded, investment abroad has taken place on an impressive scale, we have given far greater freedom in international trade, there has been rising investment here at home and rising consumption and full employment. But despite that record, which is a good one and one for satisfaction in all quarters, there has been constant anxiety about the position of sterling."

The fundamental reasons for this are that Britain came out of the war with large debts and diminished reserves, and that Britain's current balance of payments surplus, which "since the beginning of 1952 (has averaged) £175 million a year," had not been big enough "to cover our long-term investment, to repay our short-term debts and at the same time to build up our reserves.

"While most of our economy has improved beyond recognition, we have not achieved as much in the field of external reserve position." In addition, Britain's "own cost-price spiral" has caused anxiety both at home and abroad.

II. *Inflation at Home:* The purpose of the Government's measures against inflation, said the Chancellor, "is to limit the availability of money; to serve notice on ourselves and on the world outside that we are no longer prepared to underwrite, through the banking system or through spending by the Government, the consequences of inflationary actions."

The specific measures were detailed by Mr. Thorneycroft. The Government spend one-third of the national income. Economies have been achieved in the social services "and must be rigorously sought. This year's current expenditure already stands 10 per cent lower, in real terms, than in 1951 . . . Wherever possible increased costs, whether of materials or wages, should be offset by reduced services or administrative economies. Substantial reductions have been found in the field of defense, and efforts are being made to achieve more in this direction."

PUBLIC CORPORATIONS

Capital expenditure is also to be controlled. "Our first measure has been to limit the investment of all public authorities in Great Britain. In money terms, their investment will be held, during the next two years, at the level of 1957-58, or approximately £1,500 million each year."

There are four main groups of investment programs in the public sector, said the Chancellor. As for power — electricity, coal and gas — "Next year we intend to spend about £450 million on investment in this field, and about £480 million in the year after . . . As to transport and communications: on the roads, we will be spending nearly £100 million over the next two years — twice the rate of this year . . . On the services of the British Transport Commission we shall be investing about £170 million in each of the next two years — a substantial increase on what is being done this year. It represents, nevertheless, a slowing down of the rate of investment planned under the railway modernization scheme . . ."

Post Office investment has been rising towards £100 million. "We plan to spend £95 million next year and £90 million in the year after." Investment for education and housing will also be affected, although the main school building program will continue unchanged. A reduction in housing, which has been absorbing between a quarter and a fifth of Britain's total investment, "is inevitable."

PRIVATE ENTERPRISE

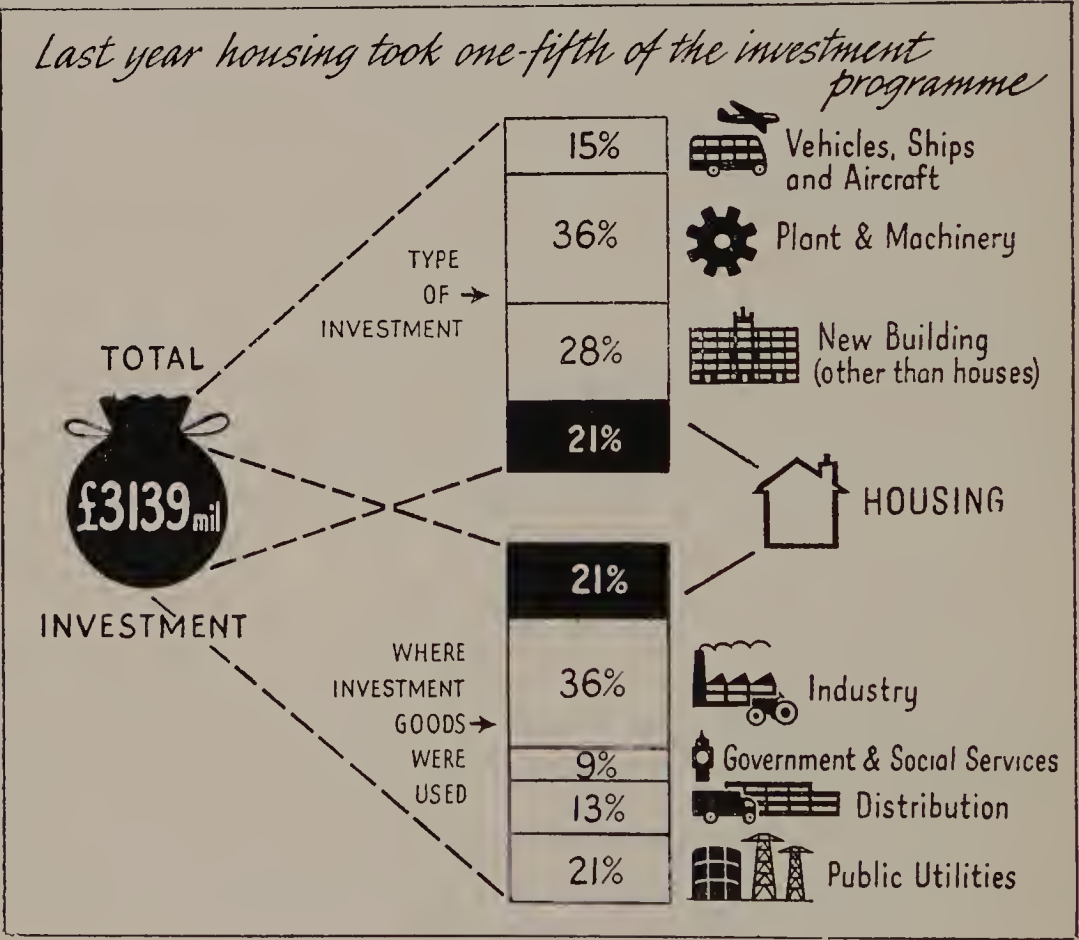
As for the private sector of industry: here, said the Chancellor, "the source of new money is bank lending, and I have asked the banks to control money supplies as in the public sector by placing a limit on the amount of money that they provide . . . They will do their best to hold the average level of advances for the next twelve months at the average level of the last twelve months . . . The bankers' efforts will be supported by the request to the Capital Issues Committee to intensify its critical

attitude to applications to borrow. They will also be fortified by the increase in the Bank Rate to 7 per cent."

On the question of wages and profits: "our object," said the Chancellor "is to secure that increases in both are more difficult to get . . . Restraint in distribution (of profits) would help our national purpose . . . Wage increases unrelated to, and going far beyond, the general growth of real wealth . . . are by far the greatest danger . . ."

DENIAL OF UNEMPLOYMENT

Mr. Thorneycroft denied that these measures would lead to unemployment. "Not on our expectations or our intentions, provided moderation is exercised all round. By that I do not mean that we must stick at any cost to an unemployment figure of 1.2 per cent . . . Without the measures which we have announced there would have been massive unemployment within a matter of months. We depend on the value of our £ to buy our food and our raw materials and a stable £ is the prerequisite of full employment. We must, therefore, put it first."



Britain's balance of payments surplus in the year ended June 1957 has proved much better than had been expected.

Britain's Payments Surplus Improves

The disturbances to trade and shipping following the Middle East crisis last year had been expected to result in much lower earnings for Britain, especially from "invisible" transactions. The latest figures on Britain's balance of payments* show that although the current balance in January-June 1957 was lower than in the same period of 1956, the difference was but £34 million due to smaller earnings from "invisibles." Thus in the year to June 1957 there was a total surplus current balance of £211 million — a substantially better figure than had earlier been expected (see Table I).

Britain's balance of payments with the Rest of the Sterling Area in the first six months of this year showed very little change from the same period of 1956 (see Table III). But the current balance with the dollar area (see Table IV) showed a marked decline from a surplus of £62 million in the first half of 1956 to a deficit of £32 million in the first half of 1957. This was more than offset by a surplus with OEEC countries and other non-sterling areas.

HIGHER INVESTMENT OVERSEAS

Net long-term investment overseas at £168 million was exceptionally large in the first half of 1957. Sterling balances owned abroad also rose during this period (see Table II). The main increases came from holdings by Britain's overseas dependencies which rose from £1,281 million to £1,309 million, and from other sterling area countries which increased their sterling balances by £41 million to £1,616 million. A decline of £25 million was recorded by "other non-sterling countries" whose balances fell (see Table II) to £278 million.

*U.K. Balance of Payments 1954 to 1957 (Cmnd. 273): 23 cents plus 5 cents mailing.

I. U.K. BALANCE OF PAYMENTS ON CURRENT ACCOUNT (£ million)

	1955	1956	1956 January- June	1956 July- December	1957 January- June (Provisional)
<i>Debits</i>					
1. Imports (f.o.b.)	3,426	3,463	1,734	1,729	1,801
2. Shipping	340	404	191	213	231
3. Interests, profits and dividends	273	266	132	134	123
4. Travel	122	123	48	75	52
5. Migrants' funds, legacies and private gifts (net) ...	18	18	3	15	17
6. Government	242	260	133	127	132
Total	4,421	4,534	2,241	2,293	2,356
<i>Credits</i>					
7. Exports and re-exports (f.o.b.)	3,070	3,404	1,701	1,703	1,776
8. Shipping	462	519	255	264	280
9. Interest, profits and dividends	340	357	174	183	177
10. Travel	111	120	54	66	56
11. Government					
(a) Defense aid (net)	46	26	12	14	18
(b) Other	59	65	38	27	57
12. Other (net)	255	288	166	122	117
Total	4,343	4,779	2,400	2,379	2,481
Current Balance ...	— 78	+245	+159	+ 86	+125
of which:					
visible trade	—356	— 59	— 33	— 26	— 25
invisibles:					
Government	—137	—169	— 83	— 86	— 57
other	+415	+473	+275	+198	+207

II. STERLING BALANCES (£ million)

	31st Dec. 1955	30th June 1956	31st Dec. 1956	30th June 1957
<i>Sterling Area Countries</i>				
U.K. Colonies	1,280	1,301	1,281	1,309
Other sterling area countries	1,599	1,599	1,575	1,616
Total — sterling area countries	2,879	2,900	2,856	2,925
<i>Non-Sterling Countries</i>				
Dollar area	58	38	37	50
Other western hemisphere countries ...	9	25	32	36
O.E.E.C. countries	213	223	193	205
Other non-sterling countries	417	363	303	278
Total — non-sterling countries	697	649	565	569
Total — All Countries	3,576	3,549	3,421	3,494
Non-territorial organisations	469	472	669	660
Total	4,045	4,021	4,090	4,154

TOURISM IS BRITAIN'S BEST \$ EARNER

The Chancellor of the Exchequer had this to say about it when opening a new hotel wing in London on October 31:

"I am glad to have this opportunity of pointing out what an important export industry the hotel business is. For it is the very basis of our tourist industry. Nearly half the total spending of tourists is done in hotels and restaurants. It was Napoleon, I think, who said an army marches on its belly; well, so to some extent does the tourist; and, unlike the soldier, the tourist can insist on a comfortable bed. They can and should insist their creature comforts are cared for. This new wing of Grosvenor House will certainly do that.

"Last year, if you include fare payments, tourism earned some £170 m. in foreign currency. That equals roughly the value of all our exports of cars last year, plus all our exports of tractors. Or, to put it round the other way, the foreign exchange we earned from tourism paid for all our imports of tea, coffee, cocoa and chocolate. Using an American phrase for a British understatement, tourism is not peanuts. Out of the £170 m. incidentally, over £50 m. was in dollars. We had over a quarter of a million visitors here from the United States and we expect the number to go on rising.

"This is an industry which is bound to grow. Nothing could be more certain, I think, than that as standards of living rise more and more people will want to visit countries outside their own. I am sure it is true of the British people. Our spending on foreign vacations is bound to go up. So we must do everything we possibly can to encourage the other side of the account, and try to make sure that, for every extra Briton who goes abroad, an extra visitor comes to Britain. This, of course, is where the British Travel and Holidays Association is doing such sterling work. Their guess is that the number of visitors to Britain can be doubled in ten years.

"Earnings from tourism are classed, in our balance of payments figures, as 'invisible' earnings; it sounds rather silly in a way, because nothing could be more visible than the impact of tourism on London in the summer. What an excellent thing it is. It adds color and variety to the London scene. . . . What I have seen here today convinces me that as far as hotel amenities go you have nothing to fear from European competition. . . ."

III. U.K. BALANCE OF PAYMENTS WITH STERLING AREA (£ million)

	1955	1956	1956 January- June	1956 July- December	1957 January- June (Provisional)
<i>Debits</i>					
1. Imports (f.o.b.)	1,407	1,369	712	657	749
2. Shipping	67	68	35	33	33
3. Interest, profits and dividends	112	134	66	68	63
4. Travel	39	41	17	24	17
5. Migrants' funds, legacies and private gifts (net) ...	—2	4	1	3	4
6. Government	164	182	92	90	91
Total	1,787	1,798	923	875	957
<i>Credits</i>					
7. Exports and re-exports (f.o.b.)	1,407	1,450	736	714	723
8. Shipping	192	200	100	100	106
9. Interest, profits and dividends	217	221	105	116	109
10. Travel	45	47	24	23	25
11. Government	18	10	6	4	11
12. Other (net)	130	169	71	98	100
Total	2,009	2,097	1,042	1,055	1,074
Current Balance	+222	+299	+119	+180	+117

IV. U.K. BALANCE OF PAYMENTS WITH DOLLAR AREA (£ million)

	1955	1956	1956 January- June	1956 July- December	1957 January- June (Provisional)
<i>Debits</i>					
1. Imports (f.o.b.)	732	761	352	409	412
2. Shipping	75	76	38	38	43
3. Interest, profits and dividends	110	70	34	36	30
4. Travel	5	5	3	2	3
5. Migrants' funds, legacies and private gifts (net) ...	15	6	—1	7	10
6. Government	15	14	7	7	7
Total	952	932	433	499	505
<i>Credits</i>					
7. Exports and re-exports (f.o.b.)	495	622	313	309	330
8. Shipping	95	108	55	53	55
9. Interest, profits and dividends	64	76	37	39	39
10. Travel	39	42	18	24	18
11. Government					
(a) Defense aid (net)	46	26	12	14	18
(b) Other	37	51	31	20	44
12. Other (net)	— 30	— 16	29	— 45	— 31
Total	746	909	495	414	473
Current Balance	—206	— 23	+ 62	— 85	— 32

Fish is a popular food all over Britain. Hence the industry, though small in the numbers employed, has a much greater social significance. A Committee of Inquiry is to review the whole industry including fleet modernization, and conservation.

Britain's Fishing Industry

Britain's fishing fleet can be divided into distant water, middle and near water, and inshore vessels. These groups are determined by the size of the vessels, the length of voyage and the grounds fished.

For example, distant water vessels are over 140 ft. and up to 185 ft. in length, and make voyages of 17 to 23 days to grounds in the Arctic Circle. The near water vessels, which are those under 130 ft. to 140 ft. in length, undertake voyages of about two weeks. Included in this group also are vessels engaged in drift net fishing which usually make daily voyages. The inshore group are mainly vessels of under 70 ft. which are seldom at sea longer than 2 days and more usually make daily landings, often fishing within sight of land.

In the United Kingdom as a whole at the end of 1956, 25,000 fishermen were regularly employed, and 3,000 occasionally employed; of these Scotland accounted for 11,700 and 1,100 respectively. The landed weight of British-caught wet fish in 1956 amounted to 18,000 long tons a week; consumption of fresh, frozen and cured fish in the United Kingdom averaged 16,800 tons landed weight a week.

In Northern Ireland there were 391 regular fishermen and the landed weight of British-caught fish was 137 tons a week. Northern Ireland consumes about one-third of its own catches and exports the rest to Great Britain and to the Republic of Ireland.

FISHING PORTS

The principal fishing ports in England and Wales are Hull, Grimsby, Fleetwood, Milford Haven and Lowestoft for white fish, and Great Yarmouth and Lowestoft for herring; in Scotland, the chief centers for white fish are Aberdeen, Leith, the Moray Firth ports, Shetland, the west coast and the Clyde, and for herring they are Fraserburgh, Peterhead, Aberdeen, Inverness, and Stornoway, as well as Shetland, the west coast and the Clyde; those in Northern Ireland are Ardglass, Portavogie and Kilkeel.

COCKLES AND MUSSELS

Britain's cockles and mussels, long famous in their own country as tasty morsels, have become popular with tourists in Britain to such an extent that a British firm is planning to export them to the United States and other countries. The company bottles half-a-million mussels and ten million cockles each week by a method that guarantees a store life of at least three months.

METHODS AND GROUNDS

The chief means of catching demersal fish, that is to say, those species which live on or near the sea bed (e.g. cod, haddock, plaice and sole), are by trawling, seining and lining. Trawling is carried on in the distant, near and middle waters for demersal fish throughout the year. The distant waters are those off Iceland, Greenland, the north coast of Norway and in the Barents Sea: the middle water grounds lie around the Faroe Islands, and the near water grounds are those in the North Sea, the Irish Sea and in coastal areas around Britain. Distant water vessels, which operate mainly from Hull, Grimsby and Fleetwood, numbered 255 at the end of 1956. Near water trawlers totalled 514, and the middle water vessels 46.

Demersal fish are also taken by seine net, the principal species being haddock, cod, whiting and plaice. An increasing number of English, Scottish and Northern Ireland vessels depend on seining for a living, the main areas of operation being in the North Sea and the Irish Sea. The numbers of Scottish and Northern Ireland vessels engaged in this fishing were over 700, and those operating from English ports numbered 170. Long lining on grounds too rough for trawling is carried on by a limited number of vessels, mainly Scottish. Lining still provides employment for a large number of inshore fishermen in autumn, winter and early spring; cod, whiting and haddock are caught.

SEASONAL FISHING

Pelagic fish, which live in the intermediate water levels or near the surface, include herrings, pilchards, mackerel and sprats. Drift nets are mainly used for taking these species but sprats may also be taken in certain localities by inshore trawling vessels. All the pelagic fisheries are seasonal. There is a summer fishery for herrings based on the Shetlands and east coast ports of Scotland, and an autumn fishery off East Anglia

based on Lowestoft and Yarmouth. Other seasonal herring fisheries also take place off the west coast of Scotland and Southern Ireland.

The inshore fisheries comprise a great diversity of types of vessels and methods of capture; trawling, seining and drift net fishing are employed but, in addition, shell fishing is extensive for shrimps, crabs, lobsters, prawns, mussels, cockles, oysters, and "Norway lobsters" or nephrops (off Scotland).

FISH AND FERTILIZERS

In the year ended December 1956, landings of fish, both demersal and pelagic, by British fishing vessels totalled 933,000 long tons (781,000 tons of demersal fish and 152,000 tons of pelagic) valued at about £46.6 million. Landings at British ports by foreign vessels totalled about 85,000 tons of fresh and frozen fish (including 39,000 tons brought direct from the fishing grounds) to a value of about £7 million. British landings of shellfish yielded £1.58 million. Cod accounted for nearly 40 per cent of the total value of wet fish landed by British vessels; haddock (17 per cent) and plaice (9 per cent) were the other most important sources of earnings to the industry.

A valuable by-product of the industry is the manufacture of fish meal for animal food and to a much lesser degree for fertilizers. Home production of white fish meal in 1956 rose by 1,000 tons; a large percentage of the fish meal is obtained from offal and most of the remainder from unsold catches. Imports of fish meal of all kinds in 1956 totalled 108,000 tons. The preparation of vitamin oils from fish livers is also a source of additional earnings. The extraction of the oil takes place at sea as soon as the fish are caught.

QUICK-FROZEN FISH

Processing and packaging of fish — curing, kippering, canning and quick-freezing for consumer packs — are the subject of continuing research and development. For example, the production of quick-frozen fish more than doubled between 1953 and 1955. With the increase in quick-freezing, new export outlets have opened up for white fish and fish products; these accounted for £2.8 million of the total British exports of fish, valued at £5.8 million in 1956. Markets abroad for quick-frozen fish, mainly in Europe and the Commonwealth, and for salted cod, mainly in Latin America and the West Indies, have continued to expand, but exports of herrings, for which Eastern Europe and the Soviet Union have been large customers, have declined.

BILLINGSGATE

The principal wholesale distributing center for fish is Billingsgate market in London, which handles about 400 tons a day, but other large cities also have central fish markets. The principal method of distribution is through wholesalers, located at the ports, who buy at auctions and sell to inland wholesalers; the port wholesalers prepare the fish for onward shipment. Sixty special express fish trains transport the catch daily from the ports to inland centers, but increasing use is being made of road transport. Retail sales are handled by 17,000 fishmongers and about 15,000 fish friers.

SALMON AND TROUT

The principal commercial freshwater catches are salmon, sea-trout and eels. In Scotland and Northern Ireland, fixed nets along the coast and sweep or draught nets in rivers and estuaries are used; in England, drift nets are used for catching salmon in the sea, and draught nets and fixed traps in estuaries. In England and Wales, the value of the salmon catch is approximately £250,000 a year, in Scotland it amounts to about £1 million, and in Northern Ireland to some £200,000. In Northern Ireland, eels worth £80,000 a year are captured by long lines and by eel nets placed in river weirs.

PROTECTION AND REGULATION

Laws in Britain relating to fisheries and fish are principally directed to the following purposes: (1) protection of supply by measures against over-fishing, e.g., the Sea Fisheries Regulation Act, 1888, the Sea-Fishing Industry Act, 1933, and the Sea Fish Industry Act, 1938; (2) promotion of the prosperity of the industry, e.g., the Herring Industry Acts, 1935 to 1953, the White Fish Industry Acts, 1951 and 1953, and the Fisheries Act, 1955; (3) protection of the quality of the product, e.g., the Food and Drugs Act, 1955.

The Government Departments mainly responsible for the administration of laws in the first two categories and for the general sponsorship of fisheries are the Ministry of Agriculture, Fisheries and Food, the Scottish Home Department, and the Ministry of Commerce for Northern Ireland; the Ministry of Health and the Department of Health for Scotland are concerned with questions of nutrition and hygiene affecting fish and fish products. The safety and welfare of crews of fishing vessels are provided for under the Merchant Shipping Acts, which are administered by the Ministry of Transport and Civil Aviation. During 1956 there were

two wrecks in the distant water fleet but no lives were lost, a fact undoubtedly due to the introduction of inflatable rubber life-rafts which were responsible for saving 57 lives and which are now compulsory.

HERRING INDUSTRY BOARD

The Herring Industry Board was set up under the Herring Industry Act of 1935 to reorganize, develop and regulate the herring industry; subsequent amending Acts have also been passed. The Board consists of a chairman and two other members, all part time and independent of the industry, who are appointed jointly by the Minister of Agriculture, Fisheries and Food, the Secretary of State for Scotland and the Secretary of State for the Home Department. The Board, which is financed partly by Government grants and loans and partly by levies and licence fees, is advised by the Herring Industry Advisory Council, consisting of representatives of the catching and shore sections of the industry.

The functions of the Board include the promotion of sales of herring, both at home and abroad, and the provision of grants and loans for the purchasing of new boats, nets and gear, and the reconditioning of existing boats. The Board is particularly active in developing new and wider markets for herring, and applying the benefits of technical progress to the industry, including the adoption of new fishing methods, and the construction of new processing plants for quick-freezing and kippering. The Board buys all herring not sold for other purposes for reduction to oil and meal, and, with the aid of Government grants, has built a number of processing factories for this purpose. A Government subsidy has

FISHING IS NOW A SCIENCE

"In the last few years we have seen the beginnings of what may fairly be called a revolution in the fishing industry," said Mr. D. Heathcoat Amory, the Minister of Agriculture, Fisheries and Food at the opening of the International Fisheries Exhibition in Lowestoft on October 21.

"It is a revolution of modernization, and one which has had its effects both afloat and ashore. The improvements in methods of navigation and of fish finding have turned fishing into a science as well as a craft; and what to my mind is even more important, radio and now the improvement of life-saving apparatus have gone far to eliminate the worst hazards of the fisherman's still arduous life."

COMMITTEE OF INQUIRY

The Committee of Inquiry into the Fishing Industry, under the chairmanship of Sir Alexander Fleck, K.B.E., F.R.S. has the following terms of reference:

"To assess, in relation to developments in fishing and the marketing of fish, the size and pattern, and implications, of an economic fishing industry in the U.K., and to report."

This was announced by Mr. D. Heathcoat Amory, the Minister of Agriculture, Fisheries and Food in the House of Commons on November 25. The Committee includes seven other members.

been paid to herring fishermen since May 1957, the primary object being to reverse the drift from herring fishing to white fish catching.

WHITE FISH AUTHORITY

The White Fish Authority was set up under the Sea Fish Industry Act, 1951, to reorganize, develop and regulate the white fish industry. It is composed of five independent members, appointed jointly by the Minister of Agriculture, Fisheries and Food, the Secretary of State for Scotland and the Secretary of State for the Home Department, and works in consultation with the industry and consumers through the White Fish Industry Advisory Council. The Authority is financed partly by Government grants and loans and partly by a levy on first-hand sales and by registration fees. The Authority has powers similar to those of the Herring Board. In the year ended March 1956, it expended nearly £100,000 on publicity campaigns to increase the consumption of fish. It also makes loans and grants for the purchase of new vessels and engines, and loans for the reconditioning of old vessels, as part of a long-term program for the modernization of the fishing fleet. In the year ended March 1956, £2 million in loans and nearly £1.3 million in grants were approved for this purpose by the Authority.

Since 1950 a subsidy from public funds has been paid to owners of near and middle water vessels and to inshore vessels engaged in the white fish industry in the United Kingdom. In 1956-57, £2.7 million was made available.

These subsidies are intended to tide the fleets over a difficult period of adjustment while the old coal-burning vessels are being replaced by a smaller fleet of more efficient modern boats. By a process of conversion to oil-burning or by the building of new vessels about half the coal-burners have been withdrawn during the past four years and it is hoped

that they will be virtually eliminated within the next four years. Then the new oil-burning or diesel vessels should be able to operate without subsidy.

SCIENTIFIC RESEARCH

The Ministry of Agriculture, Fisheries and Food maintains a laboratory for marine research, four research vessels and two experimental stations for shell-fish investigation. At Aberdeen, the Scottish Home Department has established the Fishery Research Laboratories, which conduct research into breeding grounds, movements of shoals, ocean currents and related matters. The Department of Scientific and Industrial Research maintains the Torry Research Station at Aberdeen, with a second establishment in the Humber Laboratory at Hull, where problems relating to the handling, processing, preserving and transport of fish are studied. A number of independent institutions receive grants for marine and freshwater research from public funds.

WHALING

Whaling is mainly conducted by expeditions, each consisting of a large floating factory ship accompanied by its attendant whale catchers and tankers, which annually cover large areas of the Antarctic Ocean. It is regulated by the International Whaling Commission, set up under the International Whaling Convention of 1946, which controls the dates of the season and sets a limit on the catch of whales. The offices of the Commission are in London.

The United Kingdom is the third most important country (after Norway and Japan) engaged in whaling, sending three expeditions to the Antarctic each year. The volume of the whale oil (the most important product) obtained by the British expedition in 1955-56 season amounted to about 410,000 barrels. The value of the products of British whaling expeditions landed in the United Kingdom totalled £6 million in 1955 and £6.6 million in 1956.

OFFICIAL DOCUMENTS

Annual Reports

Fisheries of Scotland
Herring Industry Board
White Fish Authority
(and accounts)

Annual Statistical Tables

Scottish Sea Fisheries
Sea Fisheries

Britain's gross domestic product — that is, the nation's total output of goods and services — increased by one-third in volume between 1948 and 1956.

Steady Rise in Britain's National Income

Britain's national income, reflecting high employment and greater prosperity generally, has been rising steadily in post-war years. The latest figures* show that between 1948 and 1956, personal incomes (before tax), as a whole, rose by 71 per cent; wages went up by 76 per cent; salaries (the number of salary earners has increased sharply since 1948) by 85 per cent; income from rent, dividends and interest by 63 per cent; and income from self-employment by 28 per cent.

In 1956 personal incomes (before tax) rose by 8 per cent; wages by 9 per cent; salaries by 8 per cent; income from rent, etc. by 8 per cent; and self-employment income by 1 per cent.

INCREASE IN SALARY EARNERS

The National Income Blue Book contains new figures on the numbers of wage and salary earners employed in manufacturing. Since 1948, the number of salary earners employed in manufacturing has increased faster than the number of wage earners; thus salary earners in 1948 made up 16 per cent of the labor force, but in 1956 they were 19 per cent. In 1956, average annual wage earnings in manufacturing industry were £482, which was an increase of nearly three-quarters on 1948. Average earnings of salaried employees in manufacturing industry were £716 in 1956, an increase of about a half on 1948.

CORPORATE INCOME AND TAXATION

Significant changes have also occurred in corporate income and taxation. Between 1948 and 1956 the total income before tax of corporations and public bodies rose by 69 per cent. In 1956, about one-quarter of corporate income went in taxes (a tenth in 1938); about one-fifth went in dividends on preference and ordinary shares (nearly one-half in 1938); and two fifths was saved (about a quarter in 1938).

**National Income and Expenditure 1957* (price \$1.08, plus 8 cents mailing, from B.I.S. Sales Section).

I. NATIONAL INCOME OF THE UNITED KINGDOM

	(£ million)			
<i>At Market Prices</i>	1938	1946	1955	1956
National Income	4,816	8,087	15,270	16,465
Capital Consumption	359	700	1,551	1,652
Gross National Product	5,175	8,787	16,821	18,117
<i>consisting of:</i>				
Employment	3,022	5,732	11,221	12,222
Self-employment	647	1,143	1,673	1,697
Trading corporations	690	1,476	2,893	3,002
Public bodies	74	103	423	467
Rent	470	414	745	797
Residual Error	—	—	— 94	— 96
less stock appreciation	80	— 125	— 200	— 150
Gross Domestic Product at Factor Cost ..	4,983	8,743	16,661	17,939
Net income from abroad	192	44	160	178
Gross National Product	5,175	8,787	16,821	18,117

II. GROSS AND NET INVESTMENT

	(£ million)			
	1938	1948	1955	1956
Gross fixed investment	656	1,430	2,855	3,139
as % of Gross National Product	12.7	13.8	17.0	17.3
Net fixed investment	297	541	1,304	1,487
as % of National Income	6.2	5.7	8.5	9.0

III. GROSS FIXED INVESTMENT BY GROUP

	(per cent of total)		
<i>Major Industrial Groups</i>	1948	1955	1956
Manufacturing	24.4	25.7	28.0
Housing	23.6	22.4	20.9
Gas, electricity, water	9.7	12.0	10.8
Mining and quarrying	2.0	3.2	3.0
Building and contracting	1.4	1.8	1.8

IV. CONSUMERS' EXPENDITURE

	(per cent of total)		
	1938	1955	1956
Food	29.2	32.5	32.5
Alcoholic Drink	6.6	6.6	6.7
Tobacco	4.2	7.1	7.1
Housing, fuel and light	16.3	12.5	12.9
Clothing	10.0	10.0	10.0
Durable household goods	5.4	7.1	7.1
Other household goods	1.2	1.2	1.2
Private motoring and cycling	3.3	4.6	3.7
Entertainments	1.7	1.7	1.7
Railway and other travel	3.8	3.8	3.8
Other items	18.3	12.9	13.3

The land of Britain is one of the most densely populated areas in the world, and it is therefore of vital importance that competing claims to its use should be settled in such a way that the necessary balance among them is achieved.

Conservation and Planning

Recognition of the fact that some form of co-ordination and central control over the use of land is essential has come about during the past fifty years. The paramount idea of the nineteenth century was that free and untrammelled enterprise was the highroad to national prosperity; any extension of Government activity beyond what was then considered its proper sphere would have been looked upon as an encroachment upon personal liberty, likely to handicap initiative so seriously as to imperil the whole future of the community. The consequence of this belief, as it affected the development of the land, was that houses, factories and communications were built wherever sites could be most cheaply and conveniently acquired. Restrictions on location were unknown, and there were virtually no regulations for the preservation of amenity in either town or countryside.

The absence of any policy for the development of the land during a period of great expansion led, in the first place, to an overwhelming congestion in towns which possessed advantages for industrial enterprise and, later, when the congested conditions became intolerable, to a prodigious suburban sprawl, much of which took place on good farming land and over rich mineral deposits. It was soon found to be sterilizing some of the country's most valuable natural resources and, in addition, to be creating social and economic difficulties of its own.

NATIONAL PLANNING POLICY

During this century legislation has been passed to try and remedy the evils and most of this is now consolidated in the Town and Country Planning Acts of 1947. Amongst other matters these provide a framework or pattern of land use throughout the country by means of development plans for each area and deal with specific problems of amenity including the preservation of trees and woodlands. The prime responsibility for the administration of national policy on the use and development of land lies with the Minister of Housing and Local Government

in England and Wales and with the Secretary of State for Scotland while the detailed execution of planning control rests with the local authorities.

Under the Acts each local planning authority is required to carry out a survey of its area, taking into account both the existing facts and the future plans of the public users of the land, and to submit it to the Minister or the Secretary of State in the form of maps with a written analysis. A new survey must be carried out every five years and amendments to the plan can be made at any time. The public must be given an opportunity to see the plan and the Minister is obliged to consider local objections and where necessary hold a public enquiry.

Within this broad framework there are many other departments and agencies at work with interests and responsibilities in their particular fields.

AGRICULTURAL LAND

Farming is the concern of the Ministry of Agriculture whose guiding principle is to secure a stable and efficient industry capable of producing a large part of the nation's food requirements. The Government is empowered to provide guaranteed prices for the main agricultural products and to afford security of tenure to tenant farmers. In return farmers and landowners are expected to maintain a minimum level of efficiency in husbandry and estate management.

The retention of land in agricultural use and increased production from it are therefore of prime importance but in a country which has long been intensively cultivated, the large scale land development and conservation problems associated with new and unsettled countries arise in the U.K. only on a comparatively small scale.

The evolution of the present high standards of husbandry and farming practice has been a long process. A real revolution in farming practices occurred during the 18th century and is associated with the names of Jethro Tull, Viscount Townshend, Coke of Holkham and others. Tull, who is often thought of in connection with his invention of a horsehoe and a seed drill, is usually most highly regarded for advocating the practice of deep pulverization of the soil and of seeding at two levels. Townshend made his name by popularising the new four-course Norfolk system of crop rotation — turnips; barley and oats; clover and rye-grass; and wheat.

CONTINUOUS RESEARCH

Organized research, technical services and education soon began to improve standards of land development and conservation. The first

Board of Agriculture, formed in 1793, initiated the county surveys which form perhaps the most thorough and comprehensive examination of regional farming practices ever made, before or since. The Royal Agricultural Society of England was founded in 1893 as the English Agricultural Society with the motto "Science and Practice."

Rothamsted, the first agricultural experimental station to be founded, was established in 1843 by Sir J. B. Lawes, at whose expense it was for long maintained. Since 1911 Government grants have been made annually and at present over 90 per cent of the funds are provided from Government sources.

The work of the station falls broadly into three groups:

1. Soil studies including rock weathering, soil formation and classification; fertilizers and organic manures; soil structure; cultivation, water relationship and irrigation; soil micro-organisms.
2. Biological problems relating to the growing of crops and the control of their pests and diseases.
3. Statistics, including the design and analysis of experiments, not only for the department at Rothamsted but for the National Agricultural Advisory Service and many research workers at home and overseas. Surveys of agricultural practices are undertaken.

The library, one of the finest of its kind in the world, contains over 40,000 volumes on soil science, general agriculture and kindred subjects and includes a unique collection of early books and manuscripts on agriculture.

FULL USE OF THE LAND

Modern research at Rothamsted and at various institutions which have arisen since continues to keep the United Kingdom in the vanguard of progress in the knowledge and treatment of the land and in general husbandry. Today the U.K. is producing over 50 per cent more food than before the second world war and is providing half the food for its population from its own soil compared with about one-third at that time.

The Government provides grants of up to 50 per cent of the cost to farmers working marginal land to help them carry out uneconomic operations leading to increased production. Some £20 million is also available for the rehabilitation of livestock rearing farms in upland areas, and a Hill Farming Research Organization, whose functions were widened in 1953, investigates problems connected with farming in mountains, moorlands and heaths which together comprise almost exactly one-third of the total land surface of Great Britain.

Agricultural land required for other purposes is, wherever possible,

FARMING AND AGRICULTURE

The story of farming and agriculture in Britain is told in two booklets obtainable free of charge from BIS:

Farming Britain is a forty-eight page beautifully illustrated booklet telling the story of Britain's life on the land from a farmer's point of view. Some comparisons are made with American farming methods and achievements.

Agriculture in Britain is a twenty-eight page booklet with tables and a bibliography and an appendix on agricultural research establishments. Farming here is dealt with from an organizational viewpoint. Marketing, government policy, price guarantees, and regulation and control are among the topics considered.

returned to farming. Thus the National Coal Board, although it has in the past decade produced increasing quantities of coal by strip mining, restores the land when the seams have been worked out. In many cases the land is then returned to agriculture in better condition than before mining commenced.

FORESTRY

For centuries timber was for the most part used locally and mainly for rural purposes and shipbuilding, and the State showed little interest in the promotion of forestry. Following the Industrial Revolution, cheap and easily workable timber began to be required in ever-increasing amounts for a variety of new industrial uses. Home woodlands contained neither the types nor the quantities of timber to meet this demand and the importation of timber expanded greatly.

The sudden demands of the first world war, however, brought about a realization of the need for a national forest policy. The Forestry Commission was established in 1919 to give effect to such a policy, but, although some progress was made in the next 20 years, the devastation of the country's woodlands caused by extensive felling during the second world war showed clearly that larger scale measures were needed.

In 1943 the Forestry Commissioners recommended, in their Report on Post-War Forest Policy, that from the point of view of security the nation should aim at having at least 5 million acres of productive forest, of which 2 million acres would be secured from the rehabilitation of existing woodlands and 3 million acres obtained by the afforestation of bare land. The Government accepted this as a program to be achieved by the end

of the century, by the State and private owners of woodlands working together in partnership; although the afforestation of bare land would fall mainly on the State.

THE FORESTRY COMMISSION

The Forestry Commission was established under the Forestry Act, 1919, as a national forest authority; it has the general duty of promoting the interests of forestry, the development of afforestation and the production and supply of timber. The Forestry Act, 1951, placed on the Forestry Commissioners responsibility for the maintenance of an adequate reserve of growing trees in Great Britain and gave them powers to regulate the felling of trees by the issue of licenses. The Commission, besides conducting its own forest operations, gives encouragement to private forestry and performs a wide range of general forestry duties such as research and education and the publication of technical and other literature on forestry.

During the years 1919-56 the Forestry Commission acquired land totalling 2,176,600 acres. This total comprises 1,377,000 acres classified as "forest land," of which 1 million acres had been planted by 1956 and the rest will be planted in due course, and 799,600 acres of "other land" which includes forest nurseries, rough grazing, agricultural land and land unsuitable for planting, such as the tops of mountains.

PRIVATE FORESTRY

The total area of privately owned woods (excluding woods of less than 5 acres) is about 3 million acres (2.8 million acres at the 1947 census) and contains most of the mature and semi-mature timber in Great Britain. A high proportion of the total belongs to small owners of up to about 250 acres.

Impetus has been given to the effective management of private woodlands by the introduction, under the Forestry Act, 1947, of the Dedication of Woodlands Scheme. Under this scheme, owners are invited to put their land permanently to timber production and to manage their woods in accordance with a plan agreed with the Forestry Commission, in return for the provision of financial and technical assistance. In addition, there is the Approved Woodlands Scheme in which a planting grant, but no maintenance grant, is made. The total area managed under an agreed plan was, by September 1956, over 662,000 acres excluding estates that are already working to a plan but have not been put forward for inclusion in either scheme.

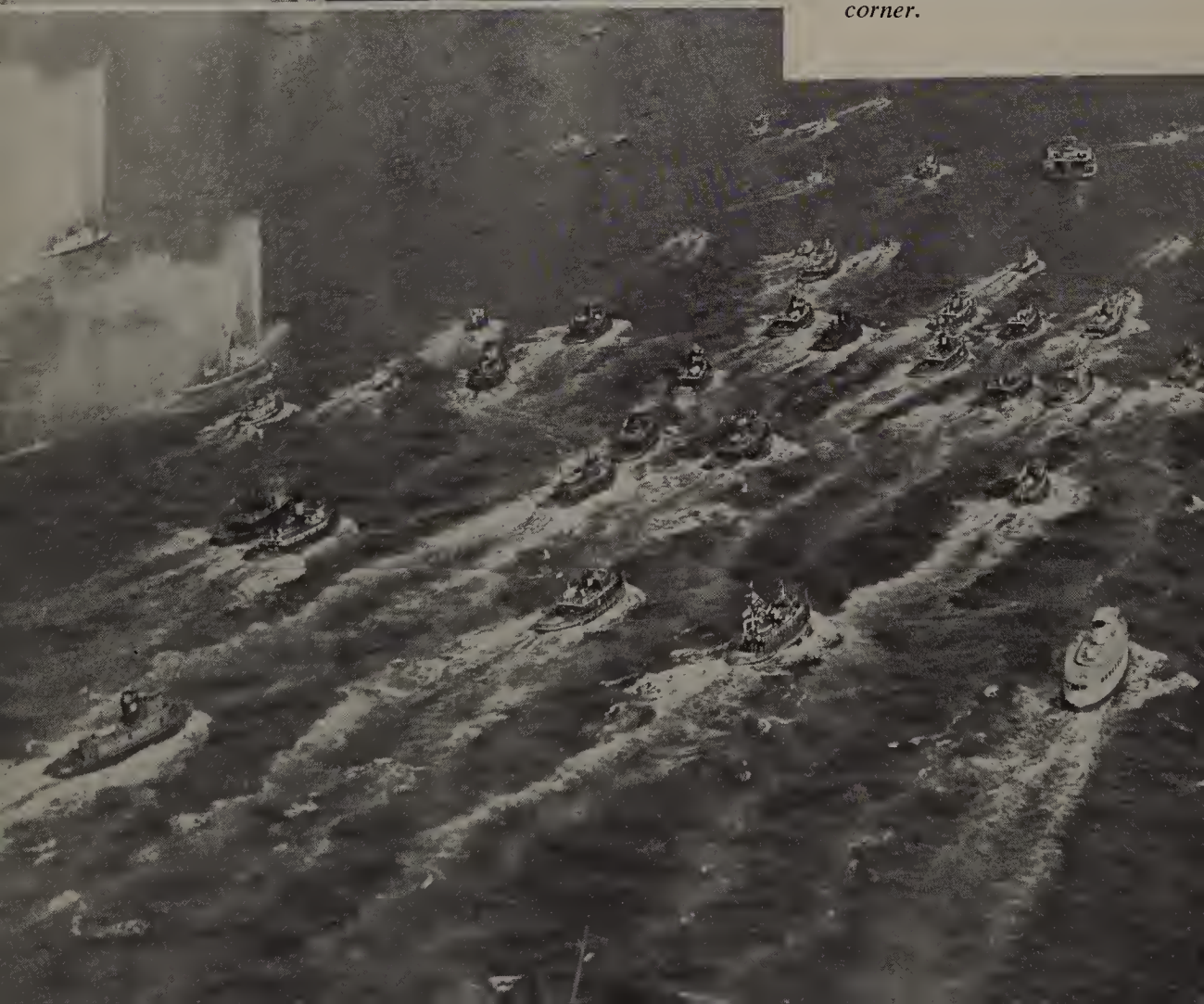


Royal Visit

On this and the following three pages is a pictorial essay of the crowded five days of the recent visit of Her Majesty Queen Elizabeth and His Royal Highness Prince Philip to the United States of America.

LEFT: Her Majesty greets President Dwight D. Eisenhower on his arrival at a state dinner at the British Embassy, Washington, D. C. The Queen wears a tiara with emeralds, a legacy from her grandmother, Queen Mary, with matching necklace and earrings.

BELOW: The armada of harbor craft that escorted the Royal Couple from Staten Island to Manhattan. The Royal ferry is the large vessel in the upper right hand corner.





New York City's traditional ticker-tape welcome. The Royal car (bottom right hand corner) leads the procession up Lower Broadway to City Hall where Mayor Robert Wagner waited for the Queen and the Prince.



The Royal Couple amused by "prisoners" in the stockade at the Jamestown Festival, Virginia, commemorating the 300th anniversary of the foundation of Britain's first colony on the American continent near by Colonial Williamsburg. LEFT: President Eisenhower and Prince Philip with the National Geographic Society's special exhibit to commemorate the Prince's four-months, 40,000 mile trip around the world this year. RIGHT: Also in Washington, D.C., the Queen, the Prince and the Duke of Edinburgh (first car) lead the procession through crowd-lined streets.



A Queen of England

The Queen of England, an Eagle Scout of Virginia. The Queen in an automobile on behalf of the Council of Boy Scouts of America. RIGHT: The Queen in a supermarket in Maryland. The Queen's basket of Maryland produce.



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The Sabbath, The Capitol and a Royal Farewell



The first ladies of the United States and the British Commonwealth escorted from the National Presbyterian Church, Washington, D. C., by the Reverend Edward L. R. Elson, the pastor. The Prince and the President attended with them. RIGHT: The Queen and Vice-President Richard M. Nixon look up to the paintings on the interior of the Capitol dome. The Vice-President was the Queen's guide for the Royal tour of Congress.



The Royal Couple's farewell as they left the Commonwealth Ball in the Seventh Regiment Armory, New York City, for the aircraft waiting to fly them back to England.

WATER SUPPLIES

Generally speaking Britain has sufficient rainfall to ensure enough water to supply all its industrial and domestic needs. It is fortunately free from the prolonged droughts experienced in many parts of the world which have such devastating effects. The problems are mainly concerned with the abstraction, storage, treatment and distribution of the water. Supplies are obtained from surface sources such as mountain lakes, streams impounded in upland gathering grounds and river intakes and from underground sources.

England and Wales are divided into 34 areas each covered by a River Board representing local government, agricultural and fisheries interests. The Boards are responsible for general management of the rivers in their area and enforce the legislation relating to pollution.

NATIONAL PARKS COMMISSION

The National Parks and Access to the Countryside Act, 1949, provided for the designation of a number of extensive areas of beautiful and relatively wild country in England and Wales as National Parks. The characteristic landscape of these areas is to be carefully preserved, and facilities for open-air recreation are to be improved or provided.

A National Parks Commission for England and Wales was set up and by the end of September 1956 its work had resulted in the establishment of the first nine of the 12 National Parks recommended by the National Parks (England and Wales) Committee, which reported in 1947.

The established parks are: the Peak District, the Lake District, Snowdonia in North Wales, Dartmoor in Devonshire, the Pembrokeshire Coast, the North York Moors, the Yorkshire Dales, Exmoor in Somerset and Devon, and a tract of wild Northumbrian countryside. These parks cover a total area of 4,733 square miles.

The Commission may also select other, usually smaller, areas in England and Wales for designation as areas of outstanding natural beauty in order to keep them unspoiled. The Commission has begun a review of these areas and is likely to designate the first in the near future.

A Scottish National Parks Working Party has considered all five areas recommended as National Parks in Scotland — the Trossachs, Glen Affric, the Cairngorms, Wester Ross (Loch Maree) and Glen Coe — with a view to their possible development under existing statutory powers.

NATURE CONSERVANCY

The Nature Conservancy was established by Royal Charter in 1949.

Its functions, as summarized in the charter, are "to provide scientific advice on the conservation and control of the natural flora and fauna of Great Britain; to establish, maintain and manage nature reserves in Great Britain, including the maintenance of physical features of scientific interest; and to organize and develop the research and scientific service related thereto."

It was given powers under the National Parks Act to acquire, by purchase, lease or gift, land or properties necessary for the furtherance of its objects. At the end of September 1956 there were 37 Nature Reserves in England and Wales. By the same date the Nature Conservancy, on the advice of its Scottish Committee, had established the first ten national Nature Reserves in Scotland; of these the Cairngorms Reserve, which accounts for 39,639 acres of the total of 86,662 acres of reserves in the whole of Great Britain, is the largest reserve in Great Britain and one of the largest in Europe.

PROTECTION OF FAUNA

The wild animals of the U.K. are not afforded any legal protection from hunting outside the National Park and Nature Reserves although there are certain restrictions on the methods used; and there are no legal close seasons for any species. Indeed the killing of certain creatures that are regarded as pests is encouraged and in some cases obligatory. The accidental introduction of the rabbit-killing disease myxomatosis in 1954 led in the course of the next two years to the elimination of the great majority of rabbits and subsequent legislation made the most of the opportunity to attempt to complete the clearance of large areas of the pest. At the same time the deliberate introduction of the disease in still unaffected areas is now an offense. The Nature Conservancy has since the beginning of the outbreaks been engaged in a study of the ecological consequences.

In 1954 legislation was enacted establishing the general principle that all wild birds, their nests when in use and their eggs are protected at all times. Provision was made for declaring exceptions mainly to meet the requirements of agriculture and the sporting interest. In the same Act powers were given for the establishment of bird sanctuaries. (There were already many sanctuaries in existence in the care of naturalist societies and other bodies).

The island position of the U.K. is used to advantage in the protection of its fauna and flora by strict control of the import of animals and plants and the use of quarantine where this is considered necessary and desirable. These controls mean that diseases such as rabies can be excluded.

Nuclear Power Development in Britain^{*}

by

SIR JOHN COCKCROFT

Director of the British Atomic Energy Research Establishment

The interest of the British in Atomic Energy goes back a long way in time. For in 1904 Rutherford in his classical treatise on Radioactivity wrote that there was reason to believe that an enormous store of latent energy was resident in the atoms of radioactive substances — energy which was derived from the internal energy of atoms. There seemed every reason to believe that the atomic energy of all the elements was of a similar order of magnitude.

Since that time the concept of the atomic nucleus and the artificial transmutation of atomic nuclei was due to Rutherford and his colleagues from many countries.

So it has been natural for us to take up the torch again and building on the work of Fermi and his colleagues in Chicago, take up with enthusiasm the great task of turning this enormous store of energy in atomic nuclei to producing power and heat and radiation from the nucleus for the many applications which are now developing.

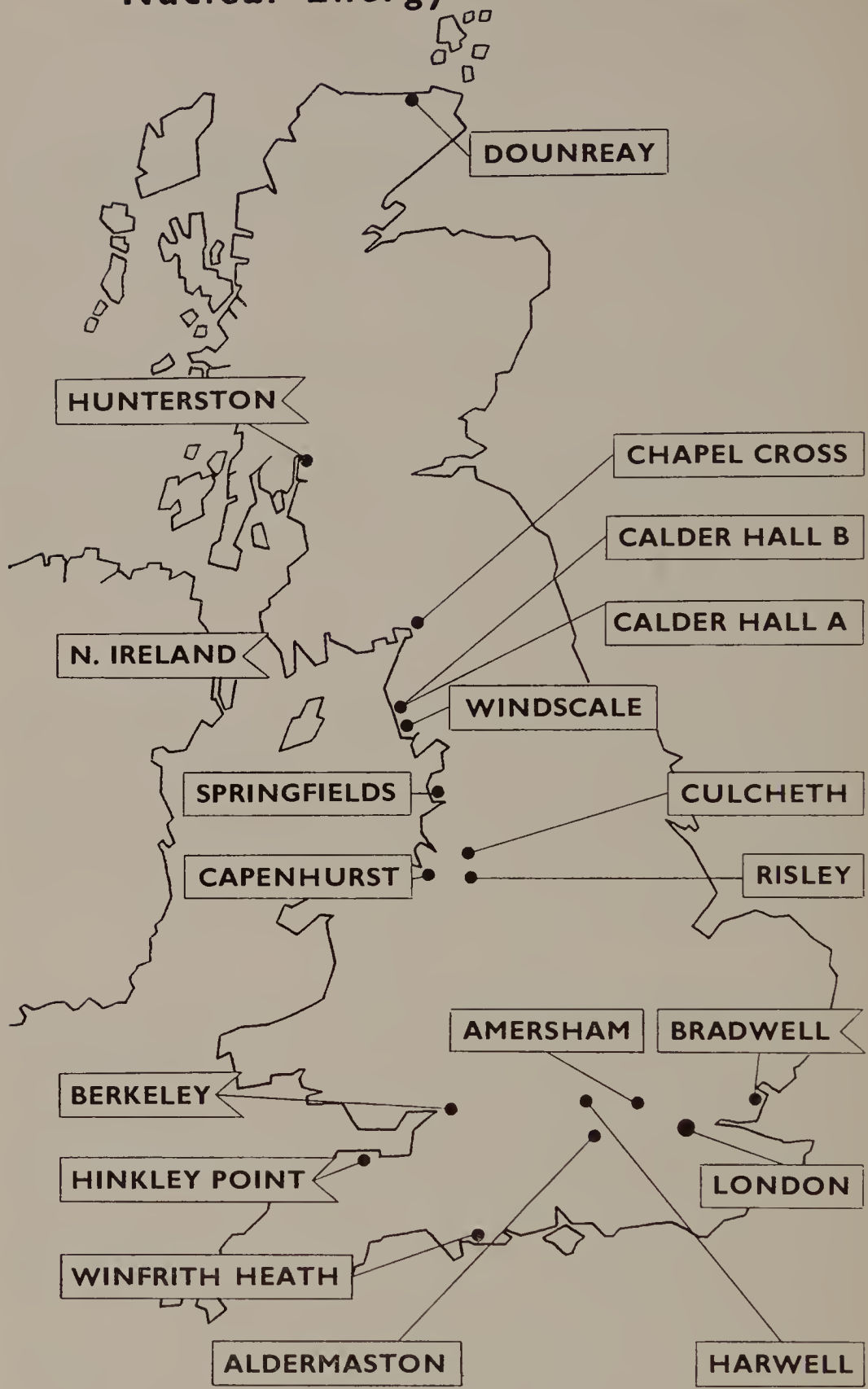
DEMAND FOR POWER

We have a special urge to develop nuclear power in Britain because our rapidly increasing requirement for energy is far outstripping our coal production. Thus our energy requirements are predicted to increase by the equivalent of 120 million tons of coal a year by 1975—an increase of 50 per cent on our present requirement. We are investing £1,000 million in our coal industry to install more modern equipment and to bring new mines into production as the old ones are worked out and become uneconomical. By these means we hope to increase our coal production by 25 million tons a year by 1975. But this still leaves an energy gap of 95 million tons of coal equivalent a year. This can only be filled by increasing oil imports and by nuclear energy.

Our imports of fuel will cost about £300 million net this year. We

^{*}An address to the Twelfth American Assembly of Columbia University, New York, on October 17, 1957.

Nuclear Energy Establishments



UKAEA Establishments



Electricity Authorities Establishments

have heard all too much lately about our balance of payment problem. Another 95 million tons of fuel imports would add greatly to our economic problems. The U.K. government has therefore embarked on a large program of nuclear power development which aims at installing 5000-6000 megawatts of nuclear power stations by 1965 and in so doing saving 18 million tons of coal a year, generating a quarter of our electricity from nuclear energy. Plans beyond that have not been formed but with the present tempo of development nuclear power might well be doing the work of 50 to 60 million tons of coal by 1975, and generating half our electricity.

RESEARCH PROGRAM

The first stage of our nuclear power program has been based on the development of Enrico Fermi's graphite pile. When we formed the U.K. project in 1946 we adopted the graphite moderated reactor as the best line of development for U.K. because we could obtain pure graphite quickly and in large quantities and because these reactors worked well on the natural uranium which was available to us.

So after we had built two graphite moderated research reactors and two air cooled plutonium producing reactors of this type it was a natural development of our experience to choose the graphite reactor as the source of heat for our first large scale nuclear power stations. After a decision in September 1950 to concentrate on this route we made a preliminary design study and carried on technological development at Harwell for two years. Four technological advances were made which put the gas cooled reactor on the map for nuclear power. First of all experiments on heat transfer showed we could greatly increase the amount of heat which could be extracted from each ton of uranium by using carbon dioxide under a pressure of 7 atmospheres to transfer the heat from the uranium fuel elements to the steam generator and by improving the surface fire of our fuel elements. Second we found out how to improve greatly the stability of uranium under irradiation. Third we developed a magnetic alloy for sheathing the uranium which allowed the fuel element surface temperature to be raised to 400°C. And finally we found by experiment that the hot carbon dioxide gas did not react too vigorously with the graphite moderator in the presence of radiation. After this preliminary study the detailed design and construction was taken over by the Industrial Group of the Atomic Energy Authority and in three years the first reactor of the power station was operating.

OPERATIONAL EXPERIENCE

This has been feeding electricity into our National Electricity Grid

for a year and at present its output is 70,000 kilowatts. Our experience in starting up Calder Hall has been very favorable. Indeed it has gone into commission with less trouble than most power stations or chemical plants. There is in fact very little to go wrong with a nuclear power station other than the conventional parts such as pumps and mechanical devices. The reactor is a huge static mass of graphite. The graphite can grow slightly by the so called Wigner effect commemorating Eugene Wigner's explanation of the growth; it can react with the hot carbon dioxide gas — but the amount of the reaction in Calder Hall has been shown to agree with previous measurements in our research reactors and is not troublesome. The fuel elements are the most likely source of trouble since the uranium crystallites in the fuel bars can grow seven fold in one direction under irradiation and if they did not have a random orientation the growth would burst the can.

So far out of 20,000 fuel elements in Calder Hall, only three have failed. The failures consist of slight cracks in the end welds. This leads to penetration of the hot carbon dioxide gas and a slow escape of fission products. The failure is detected by instruments and the fuel element can be changed at leisure. We are therefore quite pleased with the performance of Calder Hall during its first year though our irradiation experience is limited. But by the end of next year we shall be approaching the radiation exposure required for future power stations.

TECHNOLOGICAL DEVELOPMENTS

We are often asked how much Calder Hall electricity costs. To this we reply that Calder Hall was built primarily as a plutonium producer with electricity as a by-product. We sell this electricity at current commercial rates and of course we sell the plutonium to the military. Calder Hall was also designed on very conservative lines, being the first of its kind. So there is little sense in asking questions about its economics.

The real test comes with the next generation of power stations which are now being built by industry for the Electricity Authorities. During the design of Calder Hall, engineers from four groups of British Industry worked with A.E.A. designers and after that they returned to their organizations to produce the designs for the four commercial power stations. These are now being rapidly constructed to fixed price bids and will be completed in 1960/61. The most spectacular change has been that the output has been increased from the 70 megawatts of Calder Hall to about 300 megawatts in the first three stations and will be increased to 500 megawatts in the fourth, Somerset, station. This has been achieved by a series of straightforward engineering developments. First of all the ex-

perience of building Calder Hall showed that the pressure vessel walls could be increased in thickness by 50 per cent—up to three inches; this allowed the gas pressure to be increased and improved the heat ratings: second, the size of the pressure vessel will be increased to 70 foot diameter spheres in two cases and a 50 foot cylinder in the third. So the amount of uranium in the reactor has been increased from 130 tons to 250 tons.

The fuel element temperatures were also increased by about 50 degrees and so the gas outlet temperatures will be about 50 degrees C above that of Calder Hall. This is good for efficiency. These changes—twice as much uranium and better heat transfer conditions—lead to the fourfold increase in output. This has produced a considerable reduction in capital costs per kilowatt.

This process of straightforward engineering improvement has been carried still further in the Somerset station which will be operating in 1962. The reactor pressure vessels are about the same size as the 1960 stations but they will contain about 50 per cent more uranium so the power output from the two reactor stations will be 500 megawatts. This has led to a further substantial fall in capital costs per kilowatt. The designers of this station have gone further and have predicted that they could increase the output to 800 megawatts in a further design.

DEVELOPMENT POTENTIAL

This process illustrates one of the strong points of the gas cooled reactor—namely its great potentiality for development. We can, in fact, see a good deal of further improvement beyond the Somerset station as the technological work now in progress comes to fruition. Thus, we shall probably change from uranium metal fuel and magnesium alloy sheath to a ceramic fuel—uranium oxide—with a beryllium sheath—which will withstand higher temperatures. So gas outlet temperatures are likely to increase by a further 100 degrees with consequent improvements in the efficiency of conversion of heat to electricity. The high temperature and improved heat transfer conditions should enable us to achieve a further three to four fold increase in the heat extracted per ton of uranium. This means that from a given value of material the output can be increased three or four times. This is obviously good for reducing capital costs.

We shall have to pay for this by using slightly enriched uranium fuel for the initial charges of our later reactors. But by the mid 1960s we will probably recycle the secondary fuel plutonium produced in our reactors. This will provide the necessary enrichment and will at the same time reduce the natural uranium feed to the reactor four or five fold. So we will save on uranium at some extra expense for chemical processing and

refabrication. We have carried out enough experiments to be satisfied that some plutonium enriched fuels will behave well in reactors.

POWER COSTS

The costs of nuclear power depend on two main factors, the capital costs of the power station and the first charge of fuel and the fuel costs.

The capital costs per kilowatt of the 1960 power stations are a little over twice the capital costs of coal and oil fuel stations and to this we have to add the initial fuel investment. With the public utility financing of our electricity authorities and a 20 year write off and 75 per cent load factor this leads to capital charges of about 5 mils per kilowatt hour.*

The estimate of fuel costs is based on the assumption that the complete fuel element will cost about 50,000 dollars a ton whilst the spent fuel element will be bought back at a price of 15,000 dollars a ton to take account of the plutonium—valued at about five pounds a gram for fuel. We also assume that we can expect to extract from each ton of uranium the heat equivalent of 10,000 tons of coal. On this basis the net fuel cost including fuel investment charges will be from 2½ to 3 mils. So the overall cost of nuclear power for the 1960 station will be about 8 mils and about 10 per cent above the cost of power from coal fired stations in the United Kingdom. These figures are much less than the 11-14 mils quoted by Dr. Zinn for the cost of power from United Kingdom type reactors in the United States. This is because your construction costs are estimated to be about 50 per cent above United Kingdom costs—due mainly to higher labor rates—and your capital charges are about 50 per cent higher. So a 5 mil capital charge in the United Kingdom goes up to 10 mils in the United States.

Sir Christopher Hinton in a lecture delivered in Sweden early this year made a bold prediction about the course of nuclear power costs compared with conventional power. He based these predictions on a foreseeable increase in operating temperatures and a consequent fall in capital costs. He predicted that by 1970 power costs from gas cooled reactors will fall in the United Kingdom to about 5½ mils and in the following decade to under 5 mils. Development proceeds so rapidly nowadays that we believe these are conservative predictions. During this same period costs of power from coal and oil are likely to rise by ten per cent in terms of real money.

In the United Kingdom then we expect nuclear power to cost about 10 per cent more than coal power in 1960, to reach parity about 1963 and to be 30 per cent cheaper than coal power by 1970.

*1 mil is one thousandth of one dollar.

NUCLEAR ENERGY IN BRITAIN

In the revolution in science and technology based on nuclear energy, Britain may claim in many respects to be a world leader. Some of the most important events in the evolution of nuclear physics took place in Britain.

The first nuclear power station producing electricity on an industrial scale has been operated in Britain for over a year. Britain is the world's largest exporter of radio-isotopes, has embarked on an ambitious nuclear power program, has developed industrial capacity to export nuclear power stations, and is examining economic methods of nuclear propulsion. Isotope and reactor schools in Britain were among the first in the world to give training to overseas graduates.

The story of the development of the peaceful uses of nuclear energy in Britain is told in this 55-page booklet, **Nuclear Energy in Britain**, which is obtainable free of charge from BIS. It deals also with research, uranium procurement, the part played by private enterprise, and indicates some possible future developments in nuclear technology. A glossary gives brief explanations for the non-scientific reader of some of the technical terms used.

DIFFERENT FACTORS IN THE U.S.

In the United States the economic conditions are completely different. First of all nuclear power has to compete with a conventional power cost of 4 mils in many regions as compared with our 7 mils. Second, your capital charges and construction costs are both about 50 per cent above ours. So capital charges will be appreciably higher. You have, therefore, based your immediate program on the pressurized water reactor which has a reactor pressure vessel diameter of 10 feet as against 70 feet of our reactor. So PWR capital costs are lower than our 1960 reactors. On the other hand, the PWR uses enriched fuel and your fuel costs are higher. On balance you prefer the PWR.

I am sure it is a good thing that both types are being developed, for only experience can show which is the "best reactor"—if indeed there can be a "best reactor" when "best" depends so much on the frame of reference.

CONTINUING RESEARCH

We are, of course, interested in other types of reactors to see whether

we can find any type likely to be more economic in the United Kingdom. We are in fact studying, or have studied, five types with a greater or lesser degree of interest. There may, in the future, be economic advantages in changing our moderator from graphite to heavy water, especially for smaller systems. The Canadians have always worked with heavy water and we have retained an affection for it since our early days at Chalk River.

We are also building in the north of Scotland a fast breeder reactor experiment. The objective is to develop a reactor which will use the plutonium fuel coming as a by-product from our 1960/70 power stations. The fast reactor should breed about 50 per cent more fuel in its fertile material than is burnt in the core. However the fast reactor has severe technological problems arising from the fact that we will be extracting by liquid sodium 60 megawatts of heat from a 2 foot diameter core. This produces thermal strains and corresponding changes in nuclear behavior and there is likely also to be severe radiation damage. So we envisage a lengthy development period and do not contemplate introducing fast reactors into a power program before 1970. However there seems to be no economic reason or uranium-supplying reason for hurrying.

SMALL REACTORS

So far we have devoted less of our effort to develop nuclear power for commercial ship propulsion and for use in under developed countries. Many of these countries cannot absorb power in greater loads than 10 to 20 megawatts. The capital costs of their diesel stations or oil fired stations are low —of the order of 100 dollars a kilowatt, though their overall power costs with high capital charges and small load factor range from 20 mils to 40 mils.

The difficulty with low output nuclear power stations is to reduce capital costs to an acceptable level. For this purpose reactors with a small critical size have an inherent advantage. So we are studying the heavy water gas cooled reactor and the organic liquid moderated reactor as possible candidates for this role. With development work it may well be possible to bring down capital costs to the region of 300 dollars a kilowatt and overall power costs to 15 to 20 mils. The first application of small power units might well be to remote mining areas where capital is available but fuel costs are high due to long haulage. The Preparatory Commission of the International Agency recommended that the Agency should take the initiative in introducing a few nuclear power units in the less developed countries. You are already doing your

ACCIDENT AT WINDSCALE

On October 10 an accident occurred in one of the two piles of the Atomic Energy Establishment's military installation at Windscale as a result of which certain precautions were taken in the surrounding areas.

A Committee of Inquiry was immediately set up and has since reported to the Prime Minister. Because the report is a technical document dealing with the design of a defense installation and presupposes a considerable knowledge of the technology of the pile, it was considered not in the national interest to publish it. However a less technical report was prepared and has now been published as a White Paper together with reports by the Medical Research Council and others.

The White Paper, *Accident at Windscale No. 1 Pile, Cmnd. 302*, is available from B.I.S. Sales Section, price 24 cents plus 5 cents mailing.

share. This may be a good way of getting experience of their operation.

The technical and economic problems of introducing commercial nuclear ship propulsion are rather similar. Capital costs will inevitably be high at first and fuel costs must be low if quasi-economic operation is to be obtained. So we are studying reactors for this role which need only slightly enriched fuel. The most interesting project for the United Kingdom is the nuclear propelled tanker for it has a high load factor and would require a 20,000 shaft horse power propulsion unit. I hope therefore that Britain, as one of the principal maritime nations, will make a contribution to this development. But I do not see any large scale switch of commercial ships to nuclear power in the next decade.

WORK ON FUSION

We are also, like you and the USSR and many other countries, working on the exciting possibilities of releasing power by the fusion of light nuclei—the nuclei of deuterium and tritium. There is no secret about some of the possible routes to fusion power. We heat up deuterium gas to a high temperature by a powerful electric current either in a torus or a straight tube. The electrons are stripped from the nuclei by the high temperature and the gas becomes highly conducting. At the same time it is highly compressed by the constricting action of the magnetic fields surrounding the current channel. So Nature helps the experimenter in a big way then proceeds to hamper him, by prescribing that the current channel should try to wind itself into a helix. So it has a tendency to do so. It wriggles and may approach and heat up the torus. But a third

predictable phenomenon helps in turn—for electric currents are induced in the torus walls and repel the approaching filament. The experimenter can also help Nature by superimposing magnetic fields to make wriggling more difficult.

We have been working on this subject now since 1948, gradually increasing our knowledge and the scale of our equipment. Our first objective has been to reach temperatures of a few million degrees when the fusion reaction should become observable by the emission of neutrons. Two months ago we brought into commission a new and large torus we call ZETA and this is now giving us encouraging results. But the observed phenomena take a good deal of time to interpret and we require rather more time before we can give a scientific account of our results.

I should explain however that the observation of fusion reactions would be only the first step on the road to nuclear power. We have a long way to go from this point to the developing of a fusion reactor which would produce more power than we feed in. This would be stage 2 of the project. After that we still have the job of producing a practical and economic fusion reactor. So I think myself that fission reactors still have a long and useful life and will be written off before a large scale fusion power producer comes into operation. However we ought to bear in mind that technological development is today so rapid that long term forecasts often turn out to be pessimistic.

INTERNATIONAL CO-OPERATION

We have benefited greatly in the past by the exchange of scientific and technological information with the United States. For a time this was confined to chemistry and metallurgy but with the passing of the 1954 United States Atomic Energy Act collaboration was extended to physics and reactor technology. I think this has been mutually beneficial. Since then practically the whole field of commercial power development has been declassified and the 1955 Geneva Conference released a flood of technological information which we have still barely digested. This has been followed by a growth of exchange of scientific and technical information with European countries and in our case with other members of the Commonwealth.

In the long run we shall all benefit by complete freedom and openness of communication in the scientific field. The main danger will be that this exchange will be too much organised by intergovernment agencies. This could mean that we spend most of our time discussing how to exchange information and all too little on our essential job of doing experimental work.

*The Bank of England is Britain's nationalized central bank. The Treasury is the government department concerned with national finance. Each has its own responsibilities in the monetary field, as shown here by the Governor of the Bank.**

The Bank and The Treasury

by

MR. C. F. COBBOLD

Governor of the Bank of England

The Bank of England and the Treasury each has its immediate responsibilities in the monetary field. They are separate responsibilities but they often dovetail. The Bank has direct responsibility for the management of the money market, including such matters as open market operations, the credit base, and bank rate. The Treasury, quite apart from budget and fiscal questions, also has certain direct responsibilities which affect the money market from day to day, for example, the Government borrowing program. In these particular activities the relation between the Treasury and the Bank is that of principal and agent; our job is to advise and to carry out the operations.

Over and above these different market responsibilities is the Government's overriding duty to ensure conformity of monetary policy with their general policy. This position, which has been recognised by my predecessors for many years past, now finds its legal expression in Section 4 (1) of the Bank Act 1946, which, subject to certain provisos, empowers the Treasury to give directions to the Bank.

CLOSEST CONTACT MAINTAINED

In practice all this of course means that the Bank and the Treasury must work in the closest contact all the time and must do their best to harmonise their policies. And in most of their work the relationship remains the traditional one of banker and customer. Obviously between two different institutions there will at times be honest differences of opinion, which have to be discussed and resolved. I can only speak from my end of the telescope, and not for the Treasury. But, from an

*At a dinner of the Ipswich and District Center of the Institute of Bankers. October 1957.

experience which now extends over some years both before and after the Bank Act 1946, I judge that in practice this co-operation works out pretty well.

RELATIONSHIP WITH COMMERCIAL BANKS

The relationship of the "authorities" to the commercial banks is a special and somewhat different matter. Here Parliament has laid the responsibility for initiating the use of statutory powers squarely on the Bank of England. To quote the relevant section of the act:

The Bank, if they think it necessary in the public interest, may request information from and make recommendations to bankers, and may, if so authorised by the Treasury, issue directions to any banker for the purpose of securing that effect is given to any such request or recommendation.

These powers have not yet been used. If the Court of Directors — it is the Court's responsibility, and not the Governor's alone — were at any time to decide that it was "necessary in the public interest" to take action under this section, they would of course do so.

But here again, in practice, it has proved possible to proceed without invoking the use of powers. We have managed by thinking out together what seems necessary in the public interest, and then getting down together to make it work. I myself think there is much to be said for this way of doing things, so long as it delivers the goods. Complicated regulations would put the authorities and the banks on opposing sides.

CONTINUOUS EXCHANGE

The Bank is in contact with every section of the banking community in the City, day by day, and at various levels. It is therefore not difficult for the Bank of England to keep the banks continually informed of the lines of official thinking and also to keep Whitehall informed of City thinking. From time to time the Chancellor himself has explained to the bankers' representatives the Government's policy and the nature of the help which is sought from the banks: that has seemed to all of us a useful and sensible arrangement.

We have the great advantage in Britain of a closely knit banking system in a small island. I often compare notes with, for example, the chairman of the Federal Reserve Board in Washington. If I want to talk to the representatives of the British banks, or indeed of the whole financial community, we can usually get together in one room in about half an hour. He would have to have hundreds of people, many of whom would have to travel thousands of miles.

Britain's exports in 1957 will probably show an increase of some 7 per cent in value and 3½ per cent in volume on 1956 figures. Examples of Britain's export orders are given below.

U.K. Export Achievements

Steam Turbine Generator Equipment for British Columbia. Metropolitan-Vickers Electrical Export Company Limited have received an order from the British Columbia Electric Company Limited, Vancouver, for four steam turbo-generator sets totalling 800,000 h.p. An order for two further units, totalling 400,000 h.p. will be placed at a later date. The total value of the six machines will approach \$30 million. This is believed to be the largest dollar order for steam turbo-generator plant of its kind ever placed in Britain.

New Floodlighting for Niagara Falls. A contract to floodlight Niagara Falls with a new British-designed color floodlighting system to replace the existing one has been awarded to the Amalgamated Electrical Corporation Limited, Canadian subsidiary of The General Electric Company Limited, an entirely British concern. The contract, awarded by the Niagara Falls Illumination Board, comprised of corporate members from both sides of the border, is worth about £25,000.

Railway Wagons for Rhodesia Railways. Metropolitan-Cammell Carriage and Wagon Company Limited have been awarded two important exports orders for the Rhodesia Railways worth nearly £1½ million. Early in September Metro-Cammell received an order for 200 bogie covered goods wagons and now the company has been awarded a further order for 500 bogie high-sided wagons.

Buses for Australia. Municipal Tramways Trust of Adelaide, Australia, have placed a repeat order with Leyland Motors Limited, for 80 Royal Tiger World-master chassis, similar to 92 ordered by the undertaking last year.

Radar Navigation Aids for Denmark. An order worth approximately £30,000 has been received by Murphy Radio Limited, Welwyn Garden City, Herts., for a large quantity of "Rebecca" radar navigation aids designed for air navigation use and "Eureka" ground beacons for airfield installation, together with other items of specialized equipment.

Aerial Survey for Burma. An aerial survey contract to photograph 200,000 square miles of territory in Burma has been won by Fairey Air Surveys Limited, of London (a subsidiary of The Fairey Aviation Company Ltd.) and its as-

sociated company Air Survey Company of India (Pte.) Limited. It is believed to be the largest single contract ever to be signed between a Government and a private firm for aerial photography and is valued at £200,000. More than 1,500 flying hours, 40,000 negatives and 200,000 separate photographs will be involved.

Sea-water Evaporating and Distilling Plant for the Bahamas. The Crown Agents for Overseas Governments and Administrations have placed an order with G. & J. Weir Ltd., of Glasgow, for sea-water evaporating and distilling plant for the Clifton Pier Power Station of the Bahamas Electricity Corporation. This order, worth more than £500,000, was obtained in international competition through the consultants Preece, Rider and Cardew of London.

Big Washing Machine Order from New Zealand. Bendix Home Industries Limited, of Birmingham, announced on September 27 that they have received an order from New Zealand worth £500,000. The order is for 5,000 of their new "gyramatic" washing machines.

Diesel Locomotives for the Sudan. The Sudan Gezira Board has placed an order with the Hunslet Engine Company of Leeds, for 16 88-h.p. 0-6-0 type diesel-mechanical locomotives. This is the fifth order by the Board for "Hunslet" locomotives specially designed for its cotton plantation railway system located in the Barakat, Meringan and Hassa Heissa area, south of Khartoum.

Tractors for use in French Vineyards. Ransomes Sims and Jefferies, of Ipswich, recently announced that they have received an order for 280 MG.6 tractors from Maison Henri Perrier, of Paris. Most of them will be used in the vineyards of the South of France, for which work they are claimed to be ideally suited, having a low overall height and a small turning radius.

Flour Mill in the Philippines. A contract valued at nearly one million dollars has been placed with Thomas Robinson & Son Limited, of Rochdale, by Republic Flourmills Incorporated, a newly formed company in the Philippines. Achieved in the face of world-wide competition, the contract covers the design equipment of the first flourmill to be erected in the Philippines, and when completed, will be the most modern plant of its type in the world.

Housing construction in Southern Iraq. George Wimpey and Company have been awarded a £2,628,251 contract for the construction of a housing project at Basrah, Southern Iraq. The project, by the Iraq Development Board, consists of 1,776 houses.

*Britain's mobilization of over 22 million workers for war employment reached peaks unequalled by any other belligerent. The story covers so wide a field that it is told in two separate, but complementary volumes, published recently.**

Britain's Wartime Labor Problems

Britain faced a staggering labor problem in World War II. Not only was she actively engaged in war from its commencement in 1939 to its end in 1945, but she suffered internal disruption from air attack and threatened invasion. Her overseas dependencies had to be protected. The sea lanes had to be kept open for the supply for food and munitions. Thus Britain mobilized for war employment a higher percentage of her labor force than any other belligerent.

The first volume, *Manpower*, deals with the mobilization of the civilian population and its allocation to different types of war work. The second, *Labour in the Munitions Industries*, describes the use made of manpower within the industries controlled by the Supply Ministries.

PREDICTIONS FALSIFIED

The outbreak of war in 1939 falsified the belief that Hitler would immediately launch a full scale air attack on Britain so as to disrupt its economy, weaken civilian morale, and dislocate transport to prevent the despatch of troops to France to help hold the Maginot line. There were sirens but no bombs. These were the days of the phony war with over a million unemployed.

The change came with startling suddenness the following Spring when Hitler's troops raced through Europe, Mr. Winston Churchill became Prime Minister, and the late Mr. Ernest Bevin, who had never then sat in the House of Commons but had devoted his life to furthering the interests and welfare of work people, was appointed Minister of Labour by Mr. Churchill.

Mr. Bevin had as his right hand man Sir Godfrey Ince, until recently Permanent Secretary of the Ministry of Labour, and described in *Man-*

**Manpower* by H. M. D. Parker (HMSO, 1957, 535 pp. \$7.20 plus 26 cents mailing from B.I.S. Sales Section).

Labour in the Munitions Industries by P. Inman (HMSO, 1957, 461 pp. \$6.30 plus 23 cents mailing from B.I.S. Sales Section).

MANPOWER DISTRIBUTION IN BRITAIN

Males aged 14-64

	1939	1941	1943	1945
Total working population	14,656	15,222	15,032	14,881
Armed Forces	480	3,278	4,300	4,653
Civil Defense, police, etc.	80	324	253	112
Total in industry	13,083	11,520	10,422	10,021
Unemployed	1,013	100	57	95

Females aged 14-59

Total working population*	5,094	6,110	7,253	6,768
Women's Auxiliary Services	—	105	461	437
Civil Defense, police, etc.	—	59	70	15
Total in industry*	4,837	5,848	6,699	6,268
Unemployed	257	98	23	48

*Women in part-time paid employment are included, two being counted as one unit.

power as “of mature experience, wise, tranquil and discriminating, a polished draughtsman who had to an outstanding degree the gift of lucid exposition.”

UNIFIED CONTROL

Mr. Bevin's plan was to take over full control of the nation's manpower, and within little more than two weeks after Mr. Churchill became Prime Minister, a plan for the full mobilization of the nation's manpower under the unified control of a single department of State, vested with powers of direction of labor, had been devised, approved by Parliament and accepted by employers and workers alike.

This was the real beginning of the mobilization for war which, in three and a half years, was to reach its consummation. It was a gigantic task. The situation was never static. Manpower policy had frequently to be revised to meet changes in strategic plans and, as the demands of war grew in volume and intensity, so measures of increasing austerity had to be imposed on the civilian population.

FULL MOBILIZATION

Although the Armed Forces continued to expand and did not reach their maximum strength till D-Day, September 1943 was the high-water mark in the mobilization of Britain's manpower. In four years the number of men and women employed in the Armed Forces, Civil Defense, and industry had been built up to over 22 million, a rise of almost three and three-quarter millions, and of this increase nearly two and a half million were women. Nearly fifty per cent of the total population were at work.

The Armed Forces, starting in 1939 with less than half a million men,

had reached a strength of over four and a quarter million, and in the Women's Services, which the war created, some 460,000 women were serving. In the industrial field the munitions industries had expanded by close on two millions, while the less essential industries and services had declined by over three and a quarter million workers. At the same time, a decrease of 400,000 men in the essential industries had been numerically more than compensated by the addition of three-quarters of a million women.

Manpower discusses the decisions that were taken to increase the working population in this measure and to allocate the available numbers where they were most urgently required. It examines the contribution of women to the war effort; the recruitment of professional and scientific manpower; the employment of youths; the training of workers; welfare, working conditions, and wages; and industrial disputes. It includes a survey of demobilization and resettlement schemes, and post-war educational opportunities.

WORKERS FOR ARMAMENTS

The history of *Labour in the Munitions Industries* is set against the background of policy and mobilization discussed in *Manpower*. Part I gives an account of the building up of the labor force for the work of the Supply Departments and of the problems of dilution and training which this involved. Each department was, of course, faced with the same labor supply situation, but their problems varied because of differences in the timing of programs and of great diversities in the type of labor required and in conditions of work. The more acute the labor shortage became the more important it was that both Supply Departments and firms should strive to increase the productivity of their labor forces.

Part II of the *Labour* volume records the efforts to improve welfare arrangements and the methods of utilizing labor. It deals with such matters as hours of work, personnel management, wages and incentive payments, motion study, and co-operation between the two sides of industry including the establishment and working of Joint Production Committees.

BRITISH RECORD

A newsletter—**British Record**—is published every two or three weeks by BIS for those who wish to follow the British scene more closely. A specimen copy may be obtained from BIS Circulation Section. A mailing list is maintained and names will be added on request.

The only publications which British Information Services sell are those published by Her Majesty's Stationery Office; but books mentioned in this section may be read in the Library or borrowed on Inter-Library Loan.

Book Reviews

Social Policies for Old Age by B. E. Shenfield (Routledge and Kegan Paul, London, 236 pp., 25 shillings).

The growing number of older people in Britain and the social problems involved have been the subject of considerable discussion in Britain in recent years, and much has been done both nationally and locally to help elderly people overcome problems of loneliness and difficulties arising from ill-health, and, where desirable, to obtain work.

This book is an attempt to gather together both what is known of the problems involved, and the many important questions that remain unanswered, about the responsibilities of a modern community for its older citizens.

It is possible, as the author points out, that social patterns are being developed which while apparently conferring benefits upon the elderly are basically hostile to their interests. Social policies, for instance, which involve compulsory retirement from industry, or new housing intended exclusively for old people, often constructed at too great a distance from their families, may create a rather meaningless old age in which the older man or woman is set apart and loses the satisfaction of functioning as a worker, and becomes instead the recipient of well-meant and well-organized benevolence.

The book reviews relations between those who produce and those who depend on the producers; the effects of aging on employment; and the reasons for retiring or continuing at work after normal retiring age. Pensions, housing, residential and medical care are the subject of separate chapters. Three appendices consider post-war trends in the employment of older workers, employer policies towards older workers, and home conditions of persons over seventy.

His Royal Highness The Duke of Edinburgh's Study Conference (Oxford University Press, 1957, Vol. I, 338 pp., Vol. II, 339 pp., \$6.75 two vols.).

H.R.H. The Duke of Edinburgh's Study Conference at Oxford in July 1956 was concerned with the human problems of industrial communities within the British Commonwealth and Empire. Members of the Conference,

drawn from all levels of industry and from all parts of the Commonwealth and Empire, discussed the impact of industrialization upon such varied communities as those of East, West and South Africa, India and the Caribbean, as well as upon older industrial countries.

Volume I of the Report contains a Foreword by H.R.H. The Duke of Edinburgh, introductory chapters by Sir Harold Hartley, Sir Reginald Verdon Smith, Sir Alexander Fleck, and Sir Thomas Williamson, together with all the addresses, the final summing-up by Sir Philip Morris, and the reports of twenty Study Groups which were the working units of the Conference.

Volume II contains the 25 Background Papers, which were specially contributed for the Conference by writers both in the United Kingdom and from many parts of the Commonwealth and Empire, together with some notes on the internal organization of the Conference.

The Organization of British Central Government 1914-1956 by F. M. G. Willson, (George Allen & Unwin, London, 457 pp., 32 shillings).

Here is a rather specialized treatment of the history and organization of Central Government in Britain from August 1914 to the end of 1956. The main theme is the distribution of functions between government departments and the transfer of various responsibilities from one department to another.

The Survey is the work of a Study Group comprised largely of senior serving or former public officials who used as the basis of their research and discussions memoranda submitted by major government departments describing the changes that had taken place in their respective fields since 1914.

An Appendix lists chronologically the establishment, division, amalgamation and abolition of departments within the central administration; major changes concerning the Cabinets; and transfers of functions between departments. Where the changes were made by statute the Act and any relevant Statutory Order or Statutory Instrument made under the Act are given.

An Economic Survey of Northern Ireland by K. S. Isles and Norman Cuthbert (HMSO, Belfast; 1957, 646 pp., \$6.30 plus 23 cents mailing from BIS Sales).

Northern Ireland has made determined efforts in recent years to diversify its economy and reduce unemployment. Many American firms have set up branch plants there. This economic survey thus comes at an opportune moment. It is a fully detailed and historical account complete with graphs, charts, and tables, and a statistical appendix.

Although Northern Ireland is part of the United Kingdom it has special features which distinguish it from other regions. It is separated by sea from Great Britain; the British Parliament does have certain powers but most aspects of the regional economy are controlled by the Northern Ireland Government; under-employment persists on a scale unique in the United Kingdom.

In this *Economic Survey* Professor Isles and Mr. Cuthbert have made an independent study of these characteristics. An examination of Northern Ireland's special position in the United Kingdom is followed by a study of the factors controlling economic development and a discussion of some problems of economic policy.

While the focus of attention is on Northern Ireland, many of the problems discussed are of wider appeal. Thus the *Survey* will prove useful not only to businessmen thinking of establishing a plant in Northern Ireland but to professional economists and others interested in studying the problems of regional development.

Industry and Technical Progress by C. F. Carter and B. R. Williams (Oxford University Press, 1957, 244 pp., 25 shillings).

A country becomes richer either by increasing the rate of exploitation, per capita, of its natural resources of materials and human labor, or by improving the manner of that exploitation so as to fulfil human needs at less cost. Britain has to maintain a large population on small natural resources, and it does so by producing complex and advanced products, many of which can be exchanged overseas for the products it lacks at home. The use of science and technology is, from one point of view, simply the exploitation of the natural resource of brains to make up for deficiency in other resources.

It follows that Britain, perhaps more than most industrial countries, should exploit to the full her scientific resources and make as widely known as possible the results of technological developments and new ideas which flow from industrial and scientific research carried on by Government departments, industrial corporations, trade associations, and grant-aided research bodies.

Yet it is not too easy to accomplish this, partly because of the variety of organizations concerned and the difficulty of circularising all those firms and private individuals who might be interested.

This book is an authoritative report on the need for the rapid application of science and technology in British industry. After surveying the economic background, the authors examine a number of specific subjects: first, the various problems of basic research and of communicating that research to industry; then, certain key factors in the application of science and technology such as the supply of trained personnel, the supply of money, the effects of taxation, the stimulation received from other firms, and certain implications for agriculture.

B.I.S. FILM SERVICES AGAIN AVAILABLE

British Information Services announce that arrangements have been made to restore their rental and sale services of films which were withdrawn last June.

Non-Theatrical Services

An agreement has now been made with

Contemporary Films, Inc.,
13 East 37th Street,
New York 16, N. Y.

under which they will take over the B.I.S. catalogue of 16 mm films and become the officially appointed agents of B.I.S. in offering these for rental and sale as previously.

All inquiries for information about films and all applications for rental bookings, previews and sales should now be addressed to Contemporary Films.

Theatrical Services

A similar agreement in respect of 35 mm films has been made with

Lester A. Schoenfeld Films,
358 West 44th Street,
New York 36, N. Y.

All enquiries from theatrical sources should therefore be addressed in future to Lester A. Schoenfeld Films.

Television Services

B.I.S. is expanding its services for television, and has reserved all television rights in its former film library. Enquiries for such films should therefore continue to be addressed to B.I.S. offices.

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BRITISH INFORMATION SERVICES

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